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THESIS

An Assessment of Factors Which
Motivate Navy Contractors

by

Michael F. Jaggard
and
Howard Cartwright, Jr.

December 1982

Thesis Advisor:

J. Bergquist

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with current DON incentive contracting practices.

The authors found that there are many contractual and extra-contractual factors other than profit which motivate contractor behavior; that current incentive contracting methods are generally perceived to be effective; and that the best way to improve the motivation of the contractor is to reduce the impact of the forces which tend to inhibit good contract performance- which are collectively referred to as disincentives.

An Assessment of Factors Which
Motivate
Navy Contractors

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Submitted in partial fulfillment of the
requirements for the degree of

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from the

NAVAL POSTGRADUATE SCHOOL
December 1982

ABSTRACT

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The authors found that there are many contractual and extra-contractual factors other than profit which motivate contractor behavior; that current incentive contracting methods are generally perceived to be effective; and that the best way to improve the motivation of the contractor is to reduce the impact of the forces which tend to inhibit good contract performance- which are collectively referred to as disincentives.

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I. INTRODUCTION

A. RESEARCH OBJECTIVES

The Defense Acquisition Improvement Program (DAIP), initiated by Deputy Secretary of Defense Frank Carlucci in early 1980, has once again focused the attention of nearly everyone who is a player in the federal acquisition process on the many perceived management problems contained therein [Ref. 1]. Although improving the motivation of Department of Defense (DOD) contractors is not specifically stated as one of the primary purposes of the program, at least twelve of the thirty-two initiatives were designed to do just that. In a study completed in early 1981, by the Army Procurement Research Office, program instability, inappropriate contract type, and excess socio-economic regulations were identified as major disincentives by Defense contractors, and all three of these are direct subjects of individual initiatives [Ref. 2]. Additionally, many of the initiatives are directly concerned with the methods of incentivizing DOD contracts for the purpose of improving contractor motivation (e.g. the word "incentives" appears in the title of several of them). While this study is not directly concerned with the DAIP, it does focus in some considerable detail on the motivation and incentivization of major Defense contractor organizations, and hopefully will provide some insight into the potential effectiveness of the program in this area.

Over the years many theories have been developed about how to motivate groups and organizations through the application of goals and objectives. From the "Scientific Management" approach of Frederick W. Taylor through "management by Objectives" originated by Peter Drucker, and the

concept of strategic planning currently in vogue, many organizational behaviorists have attempted to identify the ideal method of managing an organization. A common thread in all of these management systems is the starting point: defining the goals and/or objectives of the organization, or planning. In the words of one writer,

"...Organizational planning has primacy over the other management functions of organizing, leading, and controlling, because these management functions operate only to carry out the decisions of planning. ...Planning focuses the attention of our organization on its goals." [Ref. 3]

It would naturally follow that the best way to motivate an organization would be to help it achieve these goals or objectives. Toward this end, the Government has developed and implemented many different incentives designed to better motivate its contractors. All of the recent press statements concerning the lack of productivity within U.S. industry, and the shrinking of the industrial base, would seem to indicate that something is not working. The purpose of this research is to attempt to identify the factors which serve to motivate Department of the Navy (DoN) major contractors, and compare these factors with the incentives currently being utilized by DoN contracting offices. The thesis will also compare the opinions of the two parties as to the relative priority of the goals and objectives of the Government. We also hope to both validate the major conclusions of some recent studies, and to suggest some changes in current government contracting procedures which will improve the government-contractor relationship.

B. RESEARCH QUESTION

Given the preceding general objectives, the following primary research question was posed: What are the major factors which motivate Department of the Navy contractors, and what is their relative priority?

The following ancillary research questions were deemed pertinent in addressing the basic research question:

1. What is the perceived relative priority of Government contracting objectives?
2. How does DON currently incentivize its contractors?
3. What is the perceived effectiveness of DON contracting incentives?
4. How can DON better motivate its suppliers through the contracting process?

C. SCOPE, LIMITATIONS, AND ASSUMPTIONS

1. Scope

After reviewing available literature on the subject of contractor motivation, particularly recent government-sponsored research reports, the authors concluded that the scope should be limited to Department of the Navy major weapons system acquisitions. The decision to concentrate on DoN was based on the fact that all of the prior studies had concentrated almost exclusively on the Departments of the Army and Air Force. One of our subordinate goals was, therefore, to compare results among the services and draw conclusions about the Department of Defense (DOD) as a whole. The concentration on major weapons system contractors was a deliberate decision based on the authors' firm belief that federal acquisition policy is driven by, and designed to support, the interrelationships of the government and its major suppliers. Although major systems buys represent a small portion of the total procurement actions within DOD, they do constitute the majority of the dollars

spent each year [Ref. 4]. Policy changes, therefore, are designed primarily to improve the major weapons system acquisition process. Recent examples include OMB Circular A-109 and the current Defense Acquisition Improvement Program discussed previously. This belief may be more appropriately characterized by some as an assumption, but either classification will suffice provided the reader is aware of its implications.

2. Limitations

The major limitation was the size of the survey samples. For a variety of reasons which could best be summed up to expediency, the authors intentionally limited the size of the samples to between 30 and 50 respondents from each of the two populations, DON Contracting Officers and their counterparts in industry. Because of the Central Limit Theorem, however, we felt that the statistical analysis of the data would not be biased nor invalidated by what might be considered an inadequate sample size (see Chapter IV, Section A).

Another self-imposed limitation was the length of the survey. Because of time and money constraints, the authors decided to conduct the survey by telephone and limit the length of any one call to between ten and fifteen minutes. This decision restricted the number of questions which could be asked, and in some respects helped determine the format of the questions. We do feel, however, that the data obtained is sufficient to support our conclusions and recommendations and answer the basic research questions.

3. Assumptions

In addition to our assumptions regarding major weapon systems vis-a-vis federal acquisition policy and the Central Limit Theorem discussed above, this study assumes

that the reader commands a general knowledge or basic familiarity with DOD contracting language and the Defense acquisition process.

D. RESEARCH METHODOLOGY

The research methodology utilized in this study consisted of two basic components: (1) development of a literature base, and (2) a survey of DON major systems program personnel and their counterparts in industry. The literature base was compiled mainly through the Defense Logistics Studies Information Exchange, the Naval Postgraduate School library and a review of various journals and periodicals which concern themselves with the federal acquisition process. The data collected from the questionnaires is presented in Chapter IV and the questionnaires themselves are included as Appendix A.

E. ORGANIZATION OF THE REPORT

The report attempts to take the reader through the subject at hand in the most logical manner possible. Chapter II presents some basic background information on motivational theory, contractor objectives, government objectives, and a brief discussion on the Defense acquisition environment. Chapter III is a current perspective of DOD incentive contracting, particularly as it is presented in the DOD and NASA Incentive Contracting Guide. Pertinent excerpts are presented in Appendix B. This will provide a background from which one can more easily review the analysis of the survey data as it is discussed in Chapter IV. In Chapter V, we will offer our conclusions and recommendations.

II. BACKGROUND

A. MOTIVATION OF ORGANIZATIONS

Motivation is defined as that which causes, channels, and sustains an organization's behavior [Ref. 5].

In an effort to better understand the factors that influence DON contractor motivation, the authors first studied several motivational theories. Organizational motivation was intensively studied by Elton Mayo during the period 1927-1932 at the Hawthorne Works (Chicago) of the Western Electric Company. Since then, many different behavioral theories on motivation have been developed. Three of the most widely accepted are presented below.

Perhaps the most renowned motivational theorist was A. H. Maslow. He studied the needs of the individual and concluded that man attempts to satisfy needs in the following order:

1. Physical needs (food and water)
2. Safety needs (shelter, physical protection)
3. Social needs (need to belong)
4. Egotistical needs (need to obtain respect)
5. Self actualization (the desire to become everything that one is capable of becoming) [Ref. 6]

Fredrick Herzberg's satisfier/dissatisfier theory on motivation claims that factors affecting worker performance can be divided into two groups. Satisfier factors are those which promote feelings of job satisfaction and include such things as recognition, achievement, responsibility, and the possibility of growth and advancement. The dissatisfiers are those factors that do not by themselves promote job satisfaction, but if not present, can lead to job dissatisfaction. Examples include pay, early retirement, job security and satisfactory home life. [Ref. 7]

Victor Vroom, another noted behavioralist, stated that the strength of a person's desire or aversion for "something" is founded not on its intrinsic properties, but on the anticipated satisfaction or dissatisfaction associated with other outcomes to which they are expected to lead.

[Ref. 8]

These, and other motivational theories studied, explain behavior in terms of either seeking the satisfaction of goals, objectives and needs, or through the avoidance of undesirable outcomes. The next section looks at contractor objectives, a necessary step in an effort to determine what are the factors which motivate them.

B. CONTRACTOR OBJECTIVES

Contractor objectives can be divided into contractual objectives and long-term corporate goals. These two categories are related in that the collective objectives of performing all Government contracts must reflect the overall long-term corporate strategy. Previous research has shown that firms have indeed more objectives than just profit [Ref. 2]. On any one contract, a contractor could have a number of different objectives. This study will identify these contractual objectives and try to determine what can be done to satisfy them in an effort to obtain better overall contract performance.

Just how strong is the profit objective? R. N. Anthony points out that managers strive for satisfactory profit rather than maximum profit. He states that in addition to being very difficult to achieve, strict profit maximization, if practiced, would be unethical and immoral. For example, profit maximization might encourage the contractor to take every possible cost-saving shortcut not expressly prohibited under the contract. [Ref. 9]

Aside from profit, what are the primary contractual objectives of the government contractor? Company growth, provide a good product, market share, develop new skills, guarantee of follow-on work, risk aversion, "mastery" (a desire to control one's own destiny), safeguard proprietary interests, flexibility to customer, utilize excess capacity, and improve cash flow have all been cited as prime business objectives [Ref. 2].

There are basically three research methods of determining the contractual objectives of a contractor for a specific contract. First, a post-performance review of contractual outcomes and associated benefits to the contractor can be conducted. However, this only identifies those objectives that were attained. Often, contractual objectives are not fulfilled and occasionally additional benefits accrue to the contractor which could be misconstrued as pre-performance contractual objectives. Second, a list of possible contractual objectives can be provided to the contractor. He can then be requested to rate the relative importance of each objective as it pertained to performance on recent contracts. This method is more likely to accurately reflect contractor objectives than the first research method mentioned, but the authors felt that providing a "shopping list" of contract objectives would tend to bias the response. After all, the intent of the research is to determine what the contractor's predetermined conscious objectives in seeking and performing the contract were, not which objectives from the list provided reflect corporate goals or happened to be fulfilled through contract performance. The third possible research method of identifying contractual objectives removes this "shopping list" bias, and was the method utilized in this study. The authors simply asked the contractor to list the top three objectives that the firm hoped to attain by performing the

contract. In addition to the actual responses, the authors felt that the ability or inability of the contractors to quickly provide the top three contractual objectives would be a reflection of the following:

1. How conscious are the contractors of specific contractual objectives as opposed to long-term corporate goals?
2. How actively are the contractors pursuing attainment of these contractual objectives?
3. How important are the objectives?
4. At what levels within the contractor organization are these goals made clear?

As previously mentioned, once contractor objectives have been identified, contractor performance can be enhanced if the Government helps in the fulfillment of these objectives. The following section discusses the Government's contractual objectives, the DOD contracting environment, and their impact on the contractor's ability to attain his objectives.

C. GOVERNMENT OBJECTIVES

The Government, like the contractor, has many varied objectives on any given contract. These objectives may be classified as either contractual objectives or extra-contractual objectives. The following are the three primary Government contractual objectives:

1. Obtaining the exact item or service called for in the specifications of the contract.
2. Obtaining it at a fair and reasonable price.
3. Ensuring on-time delivery.

Extra-contractual objectives pertain primarily to those socio-economic programs which are implemented through the contracting process. For example, small and disadvantaged business provisions, labor surplus set-asides, employment of the handicapped, and preference for domestic material (Buy American Act) are all programs which are implemented through the contracting process.

The Government should want to enhance contract performance by helping the contractors meet their objectives. However, as the APRO report points out, there are factors which affect Government contractual behavior other than the rational desire to motivate contractors. This report states that the Government is under substantial legal and formal constraints. Consequently, Government offices have little autonomy in conducting operations, tend to proliferate formal procedures and controls, and are vulnerable to many external sources of diverse influences. Another factor which makes the defense contracting environment unique is that the Government policy and procedures can be susceptible to the demands of a number of informal influences (e.g. lobbyists) and contractors may build advocacy for their mission through various constituencies and authorities (e.g. congressmen). [Ref. 2]

Several examples of statutory and regulatory constraints were identified by the APRO report. The fact that formal advertising is the preferred method of procurement [Ref. 10], limits the contracting officer's award flexibility since the contract must go to the lowest responsible, responsive bidder, without examination of other factors. This limited flexibility in source selection also tends to limit the use of certain incentives. The amount of profit payable to contractors on negotiated procurements is limited by the formal weighted guidelines profit determination method [Ref. 11]. The Government is restricted in its ability to structure payment provisions. Limits have been placed on advanced payments, progress payments, and multi-year contracting, all of which are effective contract incentives. [Ref. 2]

The implementation of Government programs (extra-contractual objectives) carry an associated myriad of mandatory contractor reporting and data requirements.

Unfortunately, it appears that the attainment of these extra-contractual Government objectives acts as a disincentive to contractors and often precludes the attainment of associated contractor goals.

D. SUMMARY

The determination of how best to motivate Government contractors requires an in-depth understanding of the inter-relationship of the contractor objectives, Government objectives, and the unique Defense acquisition environment. The Government and contractors must also understand the regulatory constraints restricting both Government flexibility and available incentives to motivate contractors. Chapter three addresses the current DoD Incentive Contracting Policy, its effectiveness, and the problems with this policy as it is now administered.

III. DOD INCENTIVE CONTRACTING

A. DEVELOPMENT

It is stated in GENESIS that where discretion exists it is apt to be exercised, and that to merely charge someone to be a good and faithful servant is not adequate to secure his performance. The Department of Defense attempts to secure performance by writing contracts which limit the contractor's discretion throughout the acquisition process. For example, if the nature of the end item limited the contractor's discretion with regard to its total cost and technical performance but provided relatively more discretion regarding the delivery schedule, then the DoD contracting officer might incorporate a delivery-date incentive into the contract in order to encourage early delivery. [Ref. 12]

Incentive contracts are by no means a contemporary innovation. Both the warship Monitor of the Civil War and the Wright brothers' "heavier-than-air" machine were acquired under incentive contracts. The Monitor had to float, attain a minimum speed, and win its first battle before the contractor was paid. The Wright brothers received a \$5,000 bonus, in addition to their \$25,000 contract price, when their flying machine exceeded the target speed by more than two miles per hour. [Ref. 13]

In an effort to expend public funds more efficiently, the techniques of incentive contracting have received ever increasing emphasis within DoD since the early 1960's. This extensive use of incentive contracts can be directly traced to the efforts of then Secretary of Defense Robert S. McNamara, under whose purview the original DoD Incentive Contracting Guide was published in 1962. Although somewhat

dated, the 1969 revised edition of the Guide remains a basic reference for current DoD incentive contracting policies and procedures. DoD has historically relied on two concepts to limit the discretion of the contractors and encourage them to make trade-offs which benefit the Government. First, the contract terms and conditions legally require certain actions and prohibit others. Second, DoD expects the profit goal to motivate the contractor to complete the contract in a manner that is beneficial to the Government. Thus, as stated in the Guide:

"The profit motive is the essence of incentive contracting. Incentive contracts utilize the drive for financial gain under risk conditions by rewarding the contractor through increased profit for attaining cost (and sometimes performance and schedule) levels more beneficial for the Government than expected (target) and by penalizing him through reduced profit for less than (target) expected levels." [Ref. 14]

The Guide also recognizes, however, that other extra-contractual factors can be significant motivators to the Defense contractor. These include growth; new product development; prestige; improved public image; social approval; national defense goals; potential for follow-on business; commercial application; excess capacities; increased profits on other contracts through shared overhead; and excelling for the sake of excellence. (See Appendix B). Also, according to the Guide, DoD "recognizes that contractors will, generally, optimize- not maximize-profit." This follows Herbert A. Simon's theory that a decision maker cannot pretend to know all possible options; at best he can only satisfy goals, not maximize them [Ref. 15]. The Guide recommends that when non-profit motives are apparent, they should be considered in the structure of incentive contracts. But this recommended use of extra-contractual motivators is limited since such

factors are often beyond the control of the DoD contracting officer. Their recommended use has not been incorporated into the Defense Acquisition Regulations in any significant manner.

It was thought by McNamara and his systems analyst advisors, that to harness the profit motive through incentive arrangements would improve both cost control and contract performance. Prior to this time, the DoD acquisition picture was not one of thrift. The urgent requirements of the Korean conflict were quickly followed by the start of both the exciting and very costly space race and the even more expensive nuclear arms race. Compressed time schedules and complex performance requirements during this period when technical risks were extremely high meant great reliance on the cost-plus-fixed-fee (CPFF) contract type. This resulted in frequent cost overruns with less than spectacular results. The fixed fee of the CPFF contract, coupled with full cost reimbursement, provided zero incentives for the contractor to control costs. Fortunately, those with sounder management backgrounds saw that such contracting did not differentiate between good or bad performance, or proper management control of costs and waste. The emphasis then shifted to the other end of the risk spectrum with encouragement for expanded use of the firm-fixed-price (FFP) type of contract for major weapon system development. Defense Contractors were enticed by the reduced risks of the newly developed total package procurement concept. This was an effort in which the developer, by his participation in the initial competition, was entitled to substantial production quantities downstream. The stated objectives, however, were not met because contractors made substantial production commitments to meet contract delivery schedules before design and cost efforts were complete. The result was extensive, and costly, redesign and rework. [Ref. 16]

Thus, during the early 1960's, the official DoD policy was changed to encourage the increased use of incentive contracts, and this policy is basically the one being followed throughout DoD almost two decades later. David Packard, former Deputy Secretary of Defense, reiterated the DoD position in 1971 in the fall issue of the Defense Management Journal:

"I firmly believe that development contracts for new weapons systems should almost always be cost incentive contracts, which provide the flexibility necessary for sound development. Further, simple incentives can be used to reward a contractor for good performance and to penalize him for a poor one..." [Ref. 17]

As stated in the introduction of this study, this emphasis on incentive contracting continues to the present.

B. CURRENT POLICY

It is current DoD policy to use a contract type that is consistent with the stage of program development and its inherent level of risk. CPFF can be the appropriate contract type when a high degree of technical and cost uncertainty exists. Once preliminary exploration has been accomplished, and the Government has generally determined performance objectives and schedule, the arena of incentive contracting can be entered. As a means of controlling cost and improving contract performance, the contractor is expected to share the risk associated with the respective stage of item development. By harnessing the contractor's profit motive to work toward effective and efficient contract performance, it is assumed that the contractor will accept ever increasing amounts of risk as uncertainties diminish. Eventually, he will reach the point where he assumes almost all risk, as would be the case in an FFP type of contract. At this point, assuming the contractor is

profit oriented, he would do everything possible to minimize costs, resulting in contract performance at or below target cost, with an end product which met or exceeded stated specifications. Between these two extremes of cost and technical risk and uncertainty- FFP and CPFF- lies the greatest challenge for effectively motivating the contractors. Herein lies the arena of incentive contracting.

The Defense Acquisition Regulations (DAR) state,

"Profit, generally, is the basic motive of business enterprise... The objective should be to insure that outstandingly effective and economical performance is met by high profits, mediocre performance by mediocre profits and poor performance by low profits to losses."
[Ref. 18]

Recognizing DoD desires to pay for performance in this correlative manner, and to assign contract risk as a function of end item definition, the DAR has been written to provide for a variety of contract types. This allows for contractual relationships wherein the contractor can provide a good product, and at the same time effectively minimize costs, in an effort to maximize profits. Theoretically, the contract can be structured by both parties so as to equitably share the risk, and this sharing would continue in follow-on contracts to the point where specifications and cost estimates are sufficiently solidified and an FFP contract can be successfully employed. The best and most complete description of the various contract types can be found in Section III of the DAR, but for purposes of this study the general guidelines referenced for use in the incentive contracting environment are listed below, as specified in the DoD Incentive Contracting Guide:

1. Fixed-Price-Incentive-Fee (FPI) (Cost Incentive Only).
Appropriate where confidence in achieving performance is high and cost and technical uncertainty can be reasonably identified.

2. Fixed-Price-Incentive-Fee (FPI) (Multiple Incentives). Appropriate where improved performance is desired and technical and cost uncertainties can be reasonably identified.
3. Cost-Plus-Incentive-Fee (CPIF) (Cost Incentive Only). Appropriate where a given level of performance is desired and confidence in achieving that performance level is reasonably good but where technical and cost uncertainty is excessive for use of a fixed-price incentive.
4. Cost-Plus-Incentive-Fee (CPIF) (Multiple Incentives). Appropriate where expectation of achieving an acceptable performance is good but improvement over that level is desired and where technical and cost uncertainties are excessive for use of FPI.
5. Cost-Plus-Award-Fee (CPAF). Appropriate where conditions for use of a CPFF are present but where improved performance is also desired and where performance cannot be measured objectively.

[Ref. 14]

In CPIF and FPI contracts the share ratio technique is used to determine the Government and contractor responsibility for cost. This provides the means to increase or decrease the profit of the contractor as a function of the cost to the Government. The limitation of a ceiling price is imposed under an FPI contract, while CPIF contracts limit the sharing over a range of incentive effectiveness (RIE). When objectives cannot be measured easily, but it is felt that performance can be incentivized, the CPAF contract provides for a subjective (and unilateral) evaluation process to determine award. Consequently good performance by the contractor (as interpreted by the Government) will lead to a high award fee, and poor performance to a low award fee, or a penalty. As indicated above, both CPIF and

FPI contracts can include multiple incentives on a combination of cost, performance and schedule (but all must include a cost incentive). The Guide states,

"Multiple incentive contracting combines the motivation for technological progress, timely delivery, and effective cost control with the ultimate object of attaining an appropriate balance between performance, schedule and cost control-- not necessarily the lowest cost. Obviously, in cost only incentives, the emphasis is on the stated performance achievement at the lowest cost." [Ref. 14]

Theoretically, a properly structured contract should communicate the Government's objectives to the contractor. The objective, therefore, of multiple incentive contracts is to encourage appropriate trade-offs between cost, schedule and performance which will yield maximum benefit to both parties. It is worth repeating, however, that profit remains the prime motivator in Government incentive contracting.

C. EFFECTIVENESS

Any general understanding of DoD incentive contracting would be incomplete without at least a summary overview of the perceived effectiveness of this contract type. Although assessment of the effectiveness of incentive contracts is not one of the objectives of this study, the authors found a review of this area most helpful in preparing and analyzing the survey. Since the effectiveness of incentives as instruments of motivation cannot be measured simply by examining contract results, the authors examined instead the results of several excellent prior studies in this area. While not all of these studies resulted in exactly the same findings, the ten presented herein are ones with which most of the studies either concurred or did not disagree. Six of the findings reflect unfavorably on incentive contracting:

1. Extra-contractual considerations dominate over profit or fee. A contractor rarely seeks to maximize profit during the short run of a single contract.
2. Incentives have not been significantly effective as protection against cost growth on major programs, even when such growth has been adjusted for high inflation.
3. Contractors establish internal upper limits on profits on Government contracts, primarily to avoid the appearance of profiteering.
4. Incentives are costly to negotiate and administer, to both the Government and contractors.
5. Contractors will not sacrifice performance attainment for profit. Performance is of such paramount importance to company image and future business acquisitions that all performance incentives provide little, if any, additional motivation to the contractor.
6. It is often impossible to pass incentive motivation to the people who carry out the contract effort on a day-to-day basis, primarily because it is difficult to relate individual activity with any specific contract.

The last four findings relate to the favorable aspects of incentives:

7. Incentives do not work to the disadvantage of the Government. When a contractor discovers that his incentive arrangements do not correspond to the Government's interests, he ignores the incentive.
8. Incentives serve to discipline the planning efforts of DoD personnel. When an incentive arrangement is to be negotiated, requirements analysis is more thorough and the work statement is more precise.

9. Incentive structures more clearly communicate the Government objectives to the contractor.
10. When it is possible to associate the activities of individual workers with specific contracts, incentives provide a useful motivational tool.

There is, in summary, no compelling evidence that incentive contracting is working. Most Government contractors have such strong motivation to emphasize performance attainment that performance incentives may be unnecessary. The use of incentives has, however, produced more thorough Government acquisition planning and more complete and precise communication of procurement objectives to the contractor. [Ref. 19]

D. CURRENT PROBLEMS

If one accepts the overwhelming evidence that incentive contracting is not effective, then one must naturally wonder what the problems are. In the course of researching this question, the authors found common agreement on two major problems. First, the Government has never been very adept at determining an appropriate target cost- an essential element of all incentive contracts. If the target cost is too high, there can be little incentive for the contractor to reduce costs. The resulting underruns in this case will be unrelated to any real cost savings or increased efficiency. On the other hand, if target cost is too low the contractor stands little chance of meeting it without impacting product quality and contract performance, and will eventually ignore the incentive. It is apparent that one key to effective incentive contracting is to obtain realistic estimates of target costs, preferably through competition.

The second major problem, which is more difficult to deal with, is DoD's basic policy that in order for incentive contracting to be effective, defense contractors must be motivated primarily by extra profits. This policy ignores the extra-contractual motivators which may be of more paramount importance to the contractor, and it usually conflicts with the Government's objective of minimizing procurement costs. This brings us to the basic question which this research was intended to address- What are the factors which motivate defense contractors? The last two chapters will present our evidence and suggest some answers to what has proven to be a very difficult question.

IV. PRESENTATION OF SURVEY DATA

A. INTRODUCTION

As was discussed in Chapter II, there are many factors other than profit which serve to motivate Defense contractors. Despite this fact, the Department of Defense rarely attempts to include any of these factors in its contracts as a means of incentivizing the contractor's performance. As was shown in Chapter III, profit remains the essence of incentive contracting within DoD. Although the DoD Incentive Contracting Guide recognizes the existence of these other factors, it describes them as "extra-contractual" factors and makes no attempt to identify a means of utilizing them in an effort to motivate the contractor through the incentive contract vehicle (see Appendix B). This apparent inconsistency is what stimulated the authors' interest in the subject, and formed the basis for our primary research question. While our original intent was to conduct the survey from the perspective of the entire DoD, our review of the available research revealed that a void existed only with respect to the Department of Navy. In order to fill this void, and to compare our results with those of prior surveys, the authors intentionally limited the range of respondents to DoN major weapons system program offices and their respective contractors. After a brief discussion of the survey development, we will present the data in three distinct phases. The first section will be an independent review of the demographic characteristics of the population sample. The second section will display and discuss the results of the four questions dealing with contractual goals and objectives,

incentives, and disincentives. The final section will be a purely subjective analysis of the responses to the last survey question. Although a survey of the entire population would have been theoretically ideal, practical considerations dictated otherwise and we sought only to achieve a sample large enough to permit extrapolation of the data to the whole population. The basis for doing so is the Central Limit Theorem, which may be stated as follows:

If n (the sample size) is large, the theoretical sampling distribution of the mean can be approximated closely with a normal distribution [Ref. 20].

This theorem is of fundamental importance in statistics, since it justifies the use of normal-curve methods to estimate infinite populations based on the results of sampling a small portion of the whole. It is difficult to say precisely how large n must be so that the Central Limit Theorem applies, but $n=30$ is usually regarded as sufficiently large. Thus, one of our considerations was to achieve a sample larger than 30 from both subgroups of the population.

B. SURVEY DEVELOPMENT

Our primary consideration in developing the survey questionnaires was, of course, to enable us to answer both the primary and ancillary research questions. To achieve this we borrowed heavily from the ideas of some of the prior studies. Another equally important consideration was our decision to conduct the survey by phone. A review of many previous studies which utilized written surveys indicated that an adequate number of responses were obtained only as a result of an intensive phone follow-up campaign. This, coupled with our desire to receive spontaneous,

non-attributional responses, led us to conclude that a phone survey would best serve our purposes. The implications of this decision were threefold: first, the total number of questions had to be limited because of the time factor involved; second, the questions had to be structured such that the respondents could readily comprehend what was being asked without frequent repeats; and third, we wanted to avoid providing the respondents with a "shopping list" of possible choices in order to preclude biasing their responses. Our final consideration was a desire to collect a limited amount of background information about the contractors. This data included:

1. Company size
2. Manufacturing process
3. Amount of government sales
4. Type of business
5. Predominant contract type
6. Nature of competition

Responses to the demographic questions were solicited from both sample groups in order to get a feeling for how well the two parties understood the basic composition of the contractors' organization, and to determine whether or not differences in their understanding would effect their responses to the non-demographic questions.

With these considerations identified, and the demographic questions completed, the authors then developed the questions designed to determine the factors which motivate DoN major contractors. In order to do this the authors decided to concentrate on three distinct types of factors:

1. Goals and Objectives
2. Incentives
3. Disincentives

Accordingly, the first two survey questions were designed so that the authors could develop a prioritized list of both Government and industry contractual goals and objectives from the perspective of both parties. These findings could then be compared with both parties' perceptions of each others goals and objectives. Next, both the contractor and Government perceptions of the three most effective contract incentives were solicited. Additionally, each respondent was asked for their perceptions of the top three factors which tend to inhibit contract performance, which the authors identify as contract disincentives. The final question solicited the opinions of both parties as to how the Government could better motivate contractors through the contracting process.

A copy of each survey questionnaire is contained in Appendix A.

C. SURVEY RESPONSES

Our search for respondents began with a roster of DoN Program Managers (PM), Procuring Contracting Officers (PCO), and Program Business/Financial Managers (B/FM) associated with major weapon system programs. Each time these personnel were surveyed, they were asked to provide names and phone numbers of their contractor counterparts. Some of the Government personnel provided more than one name and phone number, which is why the total contractor sample is larger than the total Government sample. Thirty-four Government personnel and forty-two contractors were surveyed. The data collected is presented in the next five sections.

1. Demographics

More than 70% of the contractors surveyed were employed by large corporations with a workforce in excess of 10,000 employees. One might have expected that percentage to be much higher since the survey was aimed primarily at major weapon system contractors, but the sample population did include several companies who were subcontractors. Also, many of the companies were very capital intensive and would, therefore, have a relatively smaller workforce. Both the Government personnel and the contractors yielded approximately the same relative percentages in responding to this question.

Both groups also categorized the companies' manufacturing process nearly identically. About 41% of the firms are predominantly labor intensive, 15% are capital intensive and almost 43% said they are balanced between capital and labor. Many of the latter respondents indicated, however, that their company was transitioning toward a more capital intensive type of process.

An overwhelming majority (81%) of the companies rely on Government sales for more than half of their revenue. As one of the company Vice Presidents noted to the authors during the interview, it is difficult to find a commercial market for ballistic missiles. There was a small disparity between the responses of the two groups on this question, as shown in Table I. The most logical explanation of the differences is the spontaneous nature of the survey method. The respondents were not given the opportunity to research exact figures on company sales, but rather were asked to provide their best estimates.

Over 85% of the contractors indicated that a combination of production and basic research and development best described their type of business, with production being more

TABLE I

Government Sales as a Percent of Total Contract Sales

Govt. Sales (percent)	Contractor Responses (percent)	Government Responses (percent)
10-49	19.0	11.8
50-74	26.2	41.2
74-100	54.8	47.0
Total	100.0	100.0

predominant. The remaining 15% were evenly split between services and a combination of all three. Again there was general agreement between both groups of respondents on this question.

The question regarding predominant type of contract resulted in the largest disparity between the two groups, and was generally regarded as the most difficult question to answer. As can be seen in Table II, however, both groups

TABLE II

Predominant Contract Type Used

Contract Type	Contractor Response (percent)	Government Response (percent)
FPI	38.1	61.8
CPIF	23.8	11.8
CPAF	9.5	11.8
FFP	23.8	11.8
Other	4.8	2.8
Total	100.0	100.0

selected Fixed-Price Incentive (FPI) most frequently. The differences can be explained in part by the fact that a good number of the companies had contracts with federal agencies other than DoN, and in part by the spontaneous nature of the methodology discussed previously. The "other" category represents those respondents who felt that no one contract type was predominant.

When one considers the highly technical complexity of DoN major weapon systems, it was not surprising to the authors that the majority of the respondents considered technical competition as the best description of the nature of their competitive environment. Both groups perceived technical competition as predominant, with only 14% selecting non-competitive and 25% choosing price competition. The fact that 86% of all DoN major weapon system contractors function within a competitive environment is encouraging.

In summary, the "typical" DoN major weapon system contractor can be described as a large, production-oriented corporation, producing primarily for Government sales, with an even mix of capital and labor, utilizing the entire spectrum of contract types, within a highly competitive environment. The next section discusses the motivation and incentivization of this "typical" contractor.

2. Industry Contractual Goals and Objectives

Chapter II discussed the importance of first identifying organizational goals and objectives when attempting to influence or explain that organization's behavior. Following this theory, major DoN contractors were asked in question 2 of Section II to identify the top three contractual goals or objectives which motivated them to seek and perform a recent Government contract. Responses to this question were classified into three distinct categories:

1. Financial objectives. These are objectives that, if achieved, would improve the overall financial position of the firm, and include potential for improved cash flow, additional profit and increased return on investment.
2. Strategic goals. These goals refer to the long-range company objectives. These goals generally are established by corporate management and provide the firm with overall direction and guidance that influences the development and attainment of short-term goals and objectives. Examples include company survival, company growth, develop a long-term contractual relationship, increase or maintain market share, and develop or maintain the workforce.
3. Reputation objectives. This category of contractor objectives refers to maintaining or enhancing contractor image. Providing a good quality product, enhancing public image, and ensuring on-time delivery are examples of reputation objectives.

Table III displays contractor and Government responses to question 2 of Section II in the survey. Note that 44.1% of all of the contractor goals and objectives provided, fell within the strategic objective category, with financial and reputation objectives accounting for 30.9% and 24.6% respectively. When the number one contractor objective is reviewed separately, the gap between strategic and financial objectives increases, with 45.2% of the contractors claiming their number one contractual objective to be strategic in nature and only 28.6% identifying a financial objective as their prime consideration. Government personnel placed much more emphasis on the contractor's financial goals than did the contractor, with the Government identifying 40.2% of all contractors goals as financial. This fact is better displayed by comparing both Government

TABLE III
Contractor Objectives

	I	II	III	IV
Object. Group	Kr.	Govt.	Kr.	Govt.
Financial	30.9%	40.2%	28.6%	44.2%
Strategic	44.1%	42.1%	45.2%	50.0%
Reputation	24.6%	17.7%	26.2%	5.8%
Total	100.0%	100.0%	100.0%	100.0%
Note: Columns I and II represent percentages of respondents who identified the objective group as one of their top three objectives. Columns III and IV represent percentages of respondents who identified the objective group as their number one objective.				

and contractor responses to the number one contractor objective. Financial objectives were identified by 44.2% of the Government personnel as the number one contractor consideration, while the contractors named financial goals number one only 28.6% of the time. Almost equally important to the contractors were its reputation objectives. Objectives in this category were listed by the contractor 26.5% of the time, while only 5.8% of the Government respondents identified reputation objectives as number one.

A more detailed examination of industry and Government perceptions of contractual objectives reveals several interesting findings. As shown in Table IV, both the contractors and the Government felt that profit was the contractors' number one objective. However, equally important to the contractors, and tied for number one at 26.2%, was the reputation objective of providing a good product, followed closely by strategic objectives of company survival and company growth. The fact that 88.1% of the contractors surveyed perceived either profit, providing a good product,

TABLE IV

Relative Ranking of Number one Contractor Objectives

Contractor Responses		
Rank	Objective	Percent (see note)
1	Profit/ROI	26.2
1	Provide a good product	26.2
3	Company survival	19.0
4	Company growth	16.7
5	Develop long-term relationship	9.5
6	Cost control	2.4

Government Responses		
Rank	Objective	Percent (see note)
1	Profit/ROI	38.3
2	Company survival	20.6
3	Increase market share	14.7
4	Company growth	8.8
5	Increase cash flow	5.9
5	Develop new capabilities	5.9
7	Provide a good product	5.8

Note: This column represents the percentage of respondents listing these objectives as number one.

company survival, or company growth as the number one contractual objective was not surprising. In the words of one Defense contractor corporate officer,

"They (contractor objectives) are so closely interrelated, it is difficult to rank one above the other or claim to have one objective without the other one... we're all in this business to make money... So to say profit is not a primary objective would be wrong. But it is not the only objective... Of course we want to survive and grow. But without a good reputation and adequate profits we are out of business. All four, company survival, company growth, promoting the company's reputation, and profit are primary objectives on each and every Government contract. No one objective is more important than the other."

The Government, on the other hand, perceived profit to be the primary contractor objective with 38.3% of the Government respondents listing profit/ROI as number one. The contractor's reputation objective of providing a good product received a number one ranking by only 5.8% of the Government personnel interviewed. Since this objective tied with profit for the top spot in the contractor poll, it would appear that the contractors are much more consciously aware and concerned that the company reputation is on the line with every single contract.

These findings on Government and contractor opinions of contractor objectives generally support the findings of the APRO study. That study also found that providing a good product ranked number one to the contractors, while ranking seventh among the Government employees surveyed. Profit was also found by APRO to be the number one objective according to Government opinion, while it ranked fourth among contractors below providing a good product, maintaining a long-term relationship, and improving cash flow. (APRO, 132)

Disparities between Government and industry perceptions of contractor objectives discussed above can be part of the reason for the ineffectiveness of existing DoD incentive contracting policies. Additionally, this study looked at both parties' perceptions of Government contractual objectives. The next section discusses the findings concerning this element of the contractual relationship.

3. Government Contractual Goals and Objectives

Question one of Section II in both the Government and contractor questionnaires identified the three primary objectives of the Government on any contract as (1) obtaining a fair and reasonable price; (2) on-time delivery; and (3) meeting the specifications of the contract. Each respondent was requested to rank the three Government

objectives listed above according to their perception of the Government's priorities. Responses were tallied, averaged;

TABLE V
Responses on Government Objectives

Objective	Government Avg (rank)	Industry Avg (rank)
Obtaining a fair and reasonable price	2.44 (3)	1.83 (2)
On-time delivery	2.18 (2)	2.64 (3)
Meeting the specifications	1.38 (1)	1.52 (1)

and the results are displayed in Table V.

Both Government and contractor personnel feel strongly that meeting the specifications of the contract is the most important objective of the Government. The Government believes that on-time delivery is second most important and that price is least important of the three objectives ranked. The contractors believed price was second most important to the Government and delivery third. The questionnaire results do indicate the Government does have definite priorities for its objectives, and that it has made clear to industry that meeting the specifications is most important. However, industries' perception that price is more important to the Government than on-time delivery is not in line with Government desires. The Business Financial Manager on one of the Navy's major weapon system projects commented when responding to this question:

"Our objectives on this project are first, meet the specifications; second, on-time delivery; and third, fair price. But it has been my experience that so much emphasis has been placed on precluding cost overruns, that conceivably, our objectives have been misread by our contractors."

This misreading by industry (or mistransmission by the Government) could also explain, in part, the perception that incentive contracting is not working. If the contractors perceive price to be more important than delivery, the delivery objective will, if necessary, be traded off to achieve meeting both the contract specifications and price objectives. However, had the true Government objectives been made clear, perhaps a different course of action would have been pursued, and the contract performance ultimately deemed good.

These results also support the findings of the APRO study [Ref. 2].

4. Contract Performance Incentives

An incentive is anything which will improve a contractor's motivation to perform. Many methods of incentivizing Government contracts have been employed over the years. In an effort to gauge the success of these incentives, Government and industry respondents were asked to list and rank the top three incentives (in terms of effectiveness) which have been utilized on their recent Government contracts. Table VI displays the results of this question.

The incentives mentioned by the respondents were categorized into three groups; contract-type incentives (incentivizing through a particular contract pricing arrangement- e.g., incentive fee contracts, award fee contracts), contract-provision incentives (those incentives which can be the result of a particular condition or clause

TABLE VI
Survey Responses on Contractual Incentives

Incentive	Contractor percent/ (rank)		Government percent/ (rank)	
A. Contract-type				
Incentive fee contract	20.5	(1)	22.6	(1)
Award fee contract	7.1	(6)	11.8	(3)
Fair & equitable contract	3.2	(9)	-	-
Appropriate contract type	3.2	(9)	-	-
FFP contract	-	-	1.0	(11)
Total	34.1		35.4	
B. Contract provisions				
High profit	9.5	(4)	16.7	(2)
Improved cash flow	19.8	(2)	10.7	(4)
Monetary loss for poor performance	-	-	2.0	(10)
EPA clause	-	-	1.0	(11)
Total	29.3		30.4	
C. Extra-contractual provisions				
Capital Investment protection by Govt.	11.1	(3)	4.9	(8)
Guarantee of future business	9.5	(4)	10.7	(4)
Evaluation of past performance	5.6	(7)	3.9	(9)
Good working relation	4.8	(8)	5.9	(7)
Long term funded contract	3.2	(9)	8.8	(6)
Source of RDT&E funds	2.4	(12)	-	-
Total	36.6		34.2	
Note: Percent columns represent percentage of respondents that identified the incentive as one of their top three.				

of a contract- e.g., improved cash flow, high profit, and EPA clauses), and extra-contractual incentives (those incentives not specifically provided for within the contract- e.g., capital investment protection, and evaluation of past

performance as a source selection criteria). On an aggregate group basis, both Government and industry responses were very similar. 34.1% of the contractor incentives mentioned fell into the contract-type incentive category while the Government had 35.4%. Contract provision incentives accounted for 29.3% of the contractors' responses as well as 30.4% of the Government's. Finally, the extra-contractual incentive provisions were mentioned as "top three" incentives 36.6% and 34.2% of the time by contractor and Government respondents respectively.

This aggregate similarity is somewhat misleading. The three most frequently mentioned effective incentives by contractors are in order of priority, as follows: (1) incentive fees; (2) improving cash flow; and (3) Government-provided capital investment protection. Guarantee of future business and high profit were both fourth on the contractor's list of effective incentives. The Government, however, responded with the following: (1) incentive fees; (2) high profit; and (3) award fees. Improved cash flow and guarantee of future business, both were mentioned 10.7% of the time by Government respondents which tied them for fourth. Both parties agreed that incentive fees, improving cash flow, guarantee of future business, and high profits are effective incentives. However, award fees, which ranked third on the Government's list, did not appear until sixth on the contractor list of effective incentives. Similarly, the contractors surveyed ranked Government capital investment protection third; while the Government, apparently thinking it less effective as an incentive, ranked it eighth. It does appear that monetary reward incentives (high profit, incentive fees) and risk reducing, extra-contractual rewards (guarantee of future business and Government provided capital investment protection) make excellent contract incentives.

This finding substantiates the results of the APRO study in this area. However, the APRO study identified fair and equitable contract, guarantee of future business, program continuity, and appropriate contract type as the four strongest industry incentives. Guarantee of future business, program continuity, profit, and fair and equitable contract were identified by APRO as the four most effective incentives in the Government's opinion. [Ref. 2]

The differences between this study and the APRO research findings can best be explained by the differences in survey questionnaire design. The APRO survey provided a list of possible incentives which were to be rank ordered based upon effectiveness. It was the intent of our survey to solicit spontaneous responses without biasing the answers received. Incentives like fair and equitable contract and appropriate contract type appear in the APRO study as important incentives only because respondents selected them from a "shopping list". They are not, in the opinion of the authors of this study, effective contract incentives because the contractor is not consciously aware of their existence as incentives. They do not improve a contractor's motivation to perform. This is not to say however, that they are not important attributes of a good contract. In fact, the absence of a fair and equitable contract or existence of an inappropriate contract type, will undoubtedly negatively affect the contractor's motivation. These factors are called contract disincentives and are the subject of the next section.

5. Contract Disincentives

Numerous Government actions, policies and regulations have tended to serve as disincentives to Government contractors. In an effort to compile a list of these disincentives, industry and Government personnel were requested

to identify the top three contractual disincentives that confronted their company (or in the Government's case, the company with which they did business). The following comment was typical of the responses received to the question.

"Over regulation, over regulation, over regulation." -Navy FCO of a major weapon system project.

This was undoubtedly the easiest question for both sample groups to answer. Table VII provides a summary of the findings.

The disincentives identified were categorized into four basic groups, (1) Bureaucratic-induced. Those factors that inhibit contract performance attributable to a "cost of doing business with the Government", (e.g., excessive paperwork, over regulation, government interference); (2) Financial disincentives. Those factors that may impact negatively on a contractor's financial posture, (e.g., unallowable costs, weighted guidelines, Government preoccupation with low price); (3) Factors due to poor Government planning. (e.g., Program instability, inadequate lead time, excessive number of contract changes); (4) Sovereign-induced. Those disincentives resulting from programs established by the Government to promote economic and/or social policies of the Nation. (e.g., Socio-economic programs and Government emphasis on competition).

Over half (50.1%) of all disincentives mentioned by the contractors fell into the bureaucratic-induced category, with poor planning, sovereign-induced, and financial disincentives representing 19.9%, 15.1% and 12% respectively. The Government also felt the bureaucratic-induced disincentives were the predominate problems followed by financial, poor planning and sovereign-induced disincentives. The

TABLE VII
Survey Responses on Contractual Disincentives

Disincentives	Contractor percent/(rank)		Government percent/(rank)	
A. Bureaucratic-induced				
Over regulation	21.5	(1)	19.7	(1)
Government interference	15.9	(2)	5.9	(6)
Excessive paperwork	12.7	(4)	12.7	(4)
Undue delays	-	-	1.0	(13)
Total	50.1		39.3	
B. Financial				
Weighted guidelines	2.4	(10)	6.9	(5)
Lack of capital protection	-	-	1.0	(13)
Preoccupation with low price	5.6	(6)	4.9	(8)
Unallowable costs	3.2	(8)	3.9	(9)
Lack of up-front funding	.8	(12)	3.9	(9)
Total	12.0		20.6	
C. Poor government planning				
Program instability	11.9	(5)	14.7	(2)
Poor specs/excessive contract changes	2.4	(10)	5.9	(6)
Inadequate lead-time	5.6	(6)	2.0	(12)
Total	19.9		22.6	
D. Sovereign-induced				
Socio-economic requirements	14.3	(3)	13.7	(3)
Emphasis on competition	5.8	(12)	-	-
Total	15.1		13.7	
E. Other				
Lack of contractual relation	3.2	(8)	3.9	(9)
Total	3.2		3.9	

Note: Percent columns represent percentage of respondents that identified the disincentive as one of their top three.

contractor personnel cited over-regulation as the primary disincentive. This was closely followed by Government interference, socio-economic requirements, excessive paperwork, and program instability. Government over-regulation was also cited most frequently by Government personnel surveyed, followed by program instability, socio-economic requirements, and excessive paperwork.

"Incentive contracting! If you want to incentivize me, leave me alone and let me run my defense business like I run my commercial business." -Director of Contracts, major defense contractor.

While this comment reflects the opinion of many of the contractors responding to the survey (Government interference ranked second from the top on the disincentives list), Government personnel only ranked Government interference in a tie for sixth. Since the other major disincentives cited by contractors appeared equally high on the Government's list, we can assume that at least the Government is aware of these problems. However, the Government apparently is unaware that interference is viewed as a major contract disincentive and may be negatively motivating the contractor. The final section of this chapter discusses some of the opinions of the respondents as to how these problems might be overcome.

6. A Better Way?

The purpose of the final question in the survey was to provide to the respondents the opportunity to state their opinions concerning ways to better motivate Government contractors through the acquisition process. The authors felt it was important to let the people who function so closely within the system express their views on the subject, despite the subjective nature of the question.

Because of our commitment to non-attribution, the responses will not be presented as quotable material, and the analysis, like the question itself, must be considered subjective.

The responses can be grouped, in general, into one of two distinct, yet related, categories: (1) eliminate the factors identified as disincentives; and (2) actively implement the Defense Acquisition Improvement Program (DAIP). A large number of the respondents answered question five with a simple, "Fix question four", meaning, of course, to eliminate the problems which they had just identified as disincentives in responding to question four. Additionally, several of the respondents, during a general discussion of their opinions on the subject, reiterated their disincentives. If, for example, they had responded with program instability as one of their top three disincentives, they would also identify increased program stability as a means of better motivating the contractor. The fact that the two questions were asked successively may have influenced, to some degree, the train of thought of the respondents.

From a simple, "Push the Carlucci initiatives", to a half-hour dissertation on the benefits of multi-year procurement, it was obvious to the authors that the vast majority of the respondents viewed the DAIP as a key to improving the manner in which DoN procures major weapon systems, and thereby improving the motivation of its contractors. With very few exceptions, nearly every one of the initiatives was mentioned at least once during the seventy-six phone conversations, and nearly every respondent mentioned at least one of the initiatives. A review of Table VII reveals a better than 90% correlation between the disincentives and the problems identified by the DAIP. Thus, although the two categories of responses to the last question are definitely distinct, they are also definitely related.

Finally, one frequent response which does not really fit into either of the above categories was to structure the federal acquisition process more in line with commercial procurement practices. While this concept can be debated, at some length, a complete discussion of this subject is considered beyond the scope of this study. Instead, the authors suggest that this topic might be worthy of a separate research effort.

D. SUMMARY

The main focus of this chapter has been to reflect the major opinions of both industry and Government personnel, regarding contractual goals and objectives, incentives and disincentives. This was accomplished by examining the responses to telephone interviews conducted by the authors. During these telephone interviews a tailored version of the APRO questionnaire was administered [Ref. 2]. Additionally, respondents were afforded an opportunity to provide suggestions on how the Government could better motivate its contractors through the acquisition process. The responses to each of the survey questions, where applicable, were summarized in tables or narrative form. Chapter V will utilize the data analysis presented here to draw conclusions and make pertinent recommendations.

Finally, the authors attempted to correlate the major categories of the demographic data with the responses to the other survey questions. The purpose of doing so was to determine whether or not the differences in the nature of the contractor's organizations would yield differences in the nature of the goals and objectives, motivation, and incentives of the various companies. The results of this effort revealed no significant differences, and were therefore not presented in this report.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. The range of factors which motivate DoN major weapon system contractors is both large and extremely complex. These factors not only vary widely between organizations, but are also different among the various levels of management in any one organization. The Government perceives the short-term monetary objectives such as profit, cash flow and ROI to be the key motivators. The contractors express more interest in the long-term strategic objectives such as company survival and growth and the reputation objectives of producing a quality product and ensuring proper performance. Both parties agree, however, that profit is one of the key factors, and that incentive fees which can result in higher profits are an effective means of motivating the contractor.

2. Like the Army Procurement Research Office (APRO) study cited previously, the authors could find no comprehensive literature on the subject of Government contractual objectives. The authors, therefore, assumed that a fair and reasonable price, on-time delivery and meeting the specifications of the contract were the primary objectives of the Government, with such other factors as socio-economic objectives, maintenance of the industrial base and enhancement of competition being secondary objectives. In responding to this question, 100% of the respondents concurred with this assumption.

With respect to the relative priority of these three primary objectives, there is little doubt that meeting the specifications is number one. The disparity between the two parties concerning the other two objectives should be cause

for considerable concern. Given a situation in which the contractor must "trade-off" objectives (e.g. incur extra costs in order to maintain schedule), the Government must insure that it has communicated its priorities clearly. According to the results of this study, such clear communication is not always happening.

3. Both industry and Government perceived monetary rewards such as incentive fees to be the most effective types of incentives. Industry, however, saw incentive fees more effective than did the Government, which identified high profits, such as can be achieved on Firm-Fixed-Price (FFP) contracts, to be the most effective. The perceived effectiveness of incentive fees is surprising when one considers the many reports which show no empirical evidence of this [Ref. 19]. Not surprising however, was the perceived high degree of effectiveness within both groups regarding improved cash flow incentives. Most often named were such programs as flexible progress payments and milestone billing. In times of high interest rates and inflation, such programs are essential for the survival of major weapon system contractors.

Second in perceived relative effectiveness among both groups were the risk-reducing types of incentives such as capital investment protection and long-term funded contracts. While both groups rated this category, as a whole, almost equally, industry saw capital investment protection as more effective than did Government personnel. Both groups were very optimistic about the potential effectiveness of multi-year contracts as an effective type of incentive.

4. The majority of the factors identified by the sample population as disincentives- or, factors which inhibit good contractor performance- are generally beyond the control of DoN personnel. These include such factors as over

regulation, socio-economic requirements, unallowable costs and Cost Accounting Standards (CAS), which are mandated by Congress. The top three vote getters, however, are controllable at the DoN level and should be dealt with. Excess Government interference and excessive paperwork are the result of over-management of the system, which probably results, in turn, from the mistrust inherent in an adversarial contractual relationship. Better management practices at every level within DoN could eliminate these factors. Program instability, while partially the result of such Congressional actions as budget cuts and political infighting, is more the result of poor long-range planning. A well-planned program, which fits into a good long-range DoN plan for mission accomplishment, is difficult for Congress to eliminate. The fact that both groups identified essentially the same disincentives in proportionately identical degrees of concern is a good indication that both groups are equally aware of the problems, which is the first step toward correcting them.

5. Analysis of the responses to the question concerning ways to better motivate contractors leads to two major conclusions. First, both parties are convinced that striving to reduce the impact of the disincentive factors will achieve better contractor motivation. Both parties perceive this to be more important than concentrating on more and/or better incentives. Second, both parties perceive the Defense Acquisition Improvement Program (DAIP) as a viable means of achieving this goal. As mentioned previously, both of these concepts are very closely related. On the whole, the DAIP is a program aimed at correcting the many problems associated with the federal acquisition program, many of which our sample population identified as contractual disincentives.

6. In view of the methodology with which the survey sample was generated (e.g., Government personnel providing contractor points of contact), it is the authors' opinion that the Government personnel are not as familiar with, or knowledgeable of, the contractor's organization as they should be. The authors had expected a much closer match between the two groups in their responses to the demographic questions. While this is a very subjective conclusion, it is probable that this failing on the Government's part may be contributing to the inability to more effectively motivate its contractors.

B. RECOMMENDATIONS

1. DoN should develop an acquisition policy which features not only contractor ability in preaward planning, but also contractor motivation. Despite the complexity of the subject, a determination of what drives the contractor's behavior is essential to such preaward considerations as type of contract, pricing arrangement and actual negotiations. One suggested method of achieving this would be to include a survey similar to the one utilized in this report in all preaward surveys. For large, major weapon system contractors a periodic survey of all levels of the company's management would be appropriate.

2. DoN should actively support the implementation of the initiatives which comprise the DAIP. To date, only thirteen of the thirty-two initiatives have been implemented, including only three of the twelve which specifically deal with contractor motivation and contract incentives [Ref. 21].

3. It is recommended that additional research be conducted in the following areas:

a. Government contractual objectives and their effect on contractor motivation.

b. The impact of multi-year procurement on contractor motivation.

c. Potential of restructuring the federal acquisition process more in line with commercial practices, and the possible effects on contractor motivation.

APPENDIX A
SURVEY QUESTIONNAIRES

A. GOVERNMENT QUESTIONNAIRE

1. Contractor Demographic Questions

1. How large is the average firm with which you do business in terms of number of employees?

- a. 1 - 100
- b. 101 - 1,000
- c. 1,001 - 10,000
- d. > 10,000

2. The basic manufacturing process of the average firm with which you do business can best be described as:

- a. Capital intensive
- b. Labor intensive
- c. Balanced between capital and labor

3. What percent of their total business (sales) is for Government contracts?

- a. < 10%
- b. 10 - 24%
- c. 25 - 49%
- d. 50 - 74%
- e. > 74%

4. What is the primary emphasis of their Government business?

- a. Basic RDT&E
- b. Production
- c. Services
- d. Other (explain)

5. What is the predominant contract type utilized by your office?

- a. FPI
- b. CPIF
- c. CPAF
- d. FFP
- e. No single predominant contract type

6. How would you classify the competition of the average firm with which you do business?

- a. Non-competitive
- b. Price competition
- c. Technical competition
- d. Other (explain)

2. Questions on Goals and Objectives, Incentives, and Disincentives

7. It is generally accepted that the Government's three primary objectives on any contract are: (1) a fair and reasonable price; (2) on-time delivery; and (3) meeting the specifications of the contract. Rank each of these for their perceived relative importance to you.

8. There are many contractual goals and objectives which serve to motivate Government contractors. What do you perceive to be the top three goals and objectives of the firm with which you do business which motivated them to seek and perform the contract you are currently administering, and what is their relative priority?

9. Many methods of incentivizing Government contracts have been employed over the years. What do you perceive to be the top three incentives (in terms of effectiveness) which your office has utilized recently, and what is their relative priority?

10. Numerous Government policies, regulations and actions have tended to serve as disincentives to Government contractors. What do you perceive to be the top three disincentives currently confronting the firm with which you do business, and what is their relative priority?

11. In your opinion, how could the Government better motivate its contractors through the contracting process?

B. CONTRACTOR QUESTIONNAIRE

1. Contractor Demographic Questions

1. How large is your firm/division in terms of number of employees?

- a. 1 - 100
- b. 101 - 1,000
- c. 1,001 - 10,000
- d. > 10,000

2. The basic manufacturing process of your firm can best be described as:

- a. Capital intensive
- b. Labor intensive
- c. Balanced between capital and labor

3. What percent of your total business (sales) is for Government contracts?

- a. < 10%
- b. 10 - 24%
- c. 25 - 49%
- d. 50 - 74%
- e. > 74%

4. What is the primary emphasis of your firm's Government business?

- a. Basic RDT&E
- b. Production
- c. Services
- d. Other (explain)

5. What is the predominant contract type utilized in your Government business?

- a. FPI
- b. CPIF
- c. CPAF
- d. FFP
- e. No single predominant contract type

6. How would you classify the competition in your firm's/division's Government business?

- a. Non-competitive
- b. Price competition
- c. Technical competition
- d. Other (explain)

2. Questions on Goals and Objectives, Incentives, and Disincentives

7. It is generally accepted that the Government's three primary objectives on any contract are: (1) a fair and reasonable price; (2) on-time delivery; and (3) meeting the specifications of the contract. Rank each of these according to your perception of the Government's objectives.

8. There are many contractual goals and objectives which serve to motivate Government contractors. What do you perceive to be your firm's/division's top three goals/objectives which motivated you to seek and perform a recent Government contract, and what is their relative priority?

9. Many methods of incentivizing Government contracts have been employed over the years. What do you perceive to be the top three incentives (in terms of effectiveness) which your firm/division has experienced on a recent Government contract, and what is their relative priority?

10. Numerous Government policies, regulations and actions have tended to serve as disincentives to Government contractors. What do you perceive to be the top three disincentives currently confronting your firm/division, and what is their relative priority?

11. In your opinion, how could the Government better motivate its contractors through the contracting process?

APPENDIX B

EXCERPTS FROM THE DOD AND NASA INCENTIVE CONTRACTING GUIDE

A. ADVANCED STUDIES OF INCENTIVE THEORY

1. Extracontractual Influences in Government Contracting

Total, unquantified views of motivating forces have assumed traditionally that the contractor considered the following extracontractual reward factors as being equal or nearly equal to individual contract profit:

1. Company growth
New fields of business
2. Prestige (reputation and influence)
Better public image
Social approval
National goals
3. Opportunity for follow-on business
Transformation to commercial business
4. Utilization of available skills and open capacity

If a contractual incentive is to affect behavior, the values of the prospective rewards or penalties must be greater than other rewards attainable by performance goals geared specifically to the extracontractual rewards.

The Government has been engaged in studies of extracontractual influences upon organizational performance since June 1, 1967. Very little has been known up to now about the behavior of contractors' organizations in relation to the contracting process.

Organizations are complex social systems, and contractors' organizations are composed of several smaller systems which in turn are influenced by environments of

professional, functional, and individual systems. To predict the behavior of the larger system, the Government negotiator must consider two independent variables -- risk and information. Risk means contractual risk, and information means extra-contractual influences. Information means that the Government negotiator is knowledgeable about the desires of the contractor. While risk and information are independent variables, the relationship of the variables will effect bargaining behavior on the part of the contractor and should effect the bargaining behavior on the part of the Government negotiator.

Risk involves the input of resources, the time involved, the competition, the cost experience, functional capability, the understanding of the commitment, and the premiums to offset risk aversion.

Information involves the amount of knowledge concerning the contractor's desires, the strength of desire for short-run profits, and the strength of the desires to survive, to grow, and perhaps to maximize long-run profits.

The role of information in the development of contract objectives and in negotiation is emerging as an interdependent role in incentive contracting. Incentives may be defined as promises of reward or punishment contingent upon specified performances, but any performance environment is a complex area of interacting forces, and any given input to motivate performance may have unintended as well as intended consequences. The contractor's expectancies, his desires, should be matched with the direct motivational effects of an incentive structure to avoid duplication and to avoid an unintended performance action because of conflicting preferences.

In the case of most contracts, no one can insist logically that profit (with dollars as the common denominator) is not the ultimate objective. Increased short-run

profits assist in the attainment of the extracontractual profit factors, and in the long run, the extracontractual profit factors lead also to greater opportunities for future profits.

Many trade-offs are made in developing objectives for the profit and extracontractual profit operations. The top manager may want a new production facility or added production capacity more than a new warehouse when local warehouse space is available only under premium rental conditions. Thus, the manager's decision is to increase production capacity and immediate sales volume over a decision which might have been made in order to increase prestige in the market by increased sales, or it might have been made in order to keep potential competitors out of the market. The decision also might have been made solely on the basis that the salaries of the manager and the marketing manager are based more on the volume of the company's sales than on the rate of profit.

In a particular contracting situation, the contractor may be motivated to secure a contract because the nature of the product produced or the national visibility of the effort under the contract will assist in recruiting scarce engineering or scientific skills, or may assist in the retention of key personnel. Increases in advanced technological resources are also strong extracontractual profit factors. The magnitudes of these extracontractual rewards may actualize profits in both current and long-run views.

The reviews of the psychologists in their studies of extracontractual influences cover the past performance of the contractor, as well as current performance in dealing with expected performance. The following language of the psychologists deal with past performance:

"Past experience (reinforcement history) must include not only the direct experience of the performance but also vicarious experience. Response dispositions can be modified by the experience of others provided that the performer is aware of it and perceives it to be relevant to his own situation. The experiences of others may be instructive and may influence decisions."

In discussing current status, the following view is expressed:

"The momentary state of the performer has importance. It will serve to define what may serve as an incentive for performance. By 'state of the performer', we refer to such matters as current needs, interests, self-concepts, i.e., to prevailing relations between current conditions and desired end results, both internal and external."

The psychologist, assisted by economists, business administrators, sociologists, and the scientists speaks about expected performance under incentives in the following manner:

"Incentives can be defined as promises of reward or punishment (penalty) contingent upon specified performances by both parties. Thus, an incentive is a signal, evoking an anticipation of reinforcement, used for the purpose of manipulating performance. In usage, then, incentives refer to means-ends relationships, goals (anticipated reinforcements), and the means (correlated performances) for their attainment. We might speak of "incentives" when the anticipation is reward and "disincentives" when it is punishment; however, penalty is the obverse of reward. When viewed as a signal or message, the content of a promise (incentive) is plainly germane to a consideration of its consequences. For one thing, considering the magnitudes of the reward and the performance event in the light of other parameters of a total performance environment may have the functional effect of converting it to a disincentive in some other area because of conflicts. Any given inputs are likely to have ramified consequences. The importance of matching the incentive both to the propensities of a supplier and to the consumption preferences of a user becomes obvious when the environment is to be manipulated by a contractual incentive."

In the language of the contracting world, the review team has said that it is also necessary to weigh a given

contract incentive against others available (actually or potentially). The value of an incentive may vary as a function of its relations with others in the same setting and may even impact adversely on performance under certain conditions.

What is at issue is whether the performance will occur because of the incentive or whether it will occur anyway, under any type of contractual coverage with the same cost estimate.

In partial answer to the issue, incentives should not be misapplied. The limited motivational resources in the profit pool should be allocated to factors that can increase in value as a result of additional motivation. If a contractor has built a successful marketing history and corporate image around an "on time" theme by always meeting promised schedules, then it may be true that an additional incentive for schedule will be wasted. When a contractor has an overriding long-range interest in a follow-on program, then a strong performance incentive in a short-run development effort may not be necessary.

The benefits from some of the extracontractual influences accrue equally to the contractor and the Government, if the influences are identified and quantified. At the present time, we do not have the means to quantify the extracontractual influences, but the identification of some influences can certainly add such adjective weightings as "strong" or "weak". We can also review the performers when we consider corporate behavior and individual behavior. The expectations of the chief scientist and his desires for improved performance may override the expectations of the comptroller of the organization and his desires for cost reduction.

The recipient of incentives must have control over the performance which triggers the promised rewards or penalties. He must both be perceived to have such control and in fact have it. If technical direction can override the contractual directions (even by strong influences on technical behavior) the performance incentive will not be fully effective. Countervailing motivations must still be considered, even in incentives which apply only to cost.

When performance is "intrinsically motivated, a contractual incentive message may be redundant (intrinsic motivation means the contractor or his technical personnel do something because they "want to do it", while incentive motivation refers to performance because they are "made to do it"). Thus, a contractor with actual or even implied responsibility for performance (the public may assume the contractor has accepted responsibility) is intrinsically motivated. When risk is involved, this effect will be increased.

2. Using Non-Profit Goals to Advantage

Individuals or smaller organizational systems within a contractor's total organization may establish non-profit goals which are outside of the contractual parameters. The influences for these goals may be found in the contractor's overall extracontractual "policies." Some of these goals may be desirable, but only if they are identified and only if the program can afford them. When they also serve to increase contingencies, they place a barrier in front of any attempt to maximize profits.

The contractor will not (cannot) maximize profits in all parameters of a compartmentalized multiple incentive contract. The contractor will not attempt to "maximize" profits in an FPI contract. There is no profit limit in the FPI, and to maximize profit would assume an attempt to reach

a profit rate of 25 percent or 40 percent based on the cost of sales. Public opinion admittedly and consciously plays a part in the social control of contract profits. Thus, maximizing profits in FPI contracts would always mean maximizing within certain limits. In the long run, this impacts on the ability to reduce prices on follow-on contracts.

The contractor may attempt to maximize contract profits at the negotiation table to offset uncertainties, or even deficiencies in capabilities. At other times, the attempt to maximize profits at the negotiation table may be a technique to start with a higher bargaining position when the Government negotiator has not previously valued profit parameters in accordance with the DoD Weighted Guidelines or NASA profit factors. The profit budget, however, will rarely reflect the maximized profit which may be obtained at the negotiation table.

The Government negotiator can make effective use of the non-profit goals, the extracontractual influences, however, deep-seated inefficiencies and unnecessary technical contingency factors must also be identified along with the extracontractual influences. If all factors, pro and con, are identified, stronger cost incentives can be used to correct the deep-seated inefficiencies. In this way, benefits will continue to accrue to both the Government and industry. Technically competent "price analysts" must perform this type of evaluation when significantly stronger cost incentives are to be employed in the elimination of the deep-seated inefficiencies.

Automatic contractual incentives may be mathematically perfect, but will be imperfect in operation if the extracontractual influences are not weighted in some manner and used in the selection of cost ranges and performance factors. Multidimensional profit factors should be allocated on the basis of the weights of the extracontractual

influences on performance, schedule, and cost. This does not mean a reduced profit pool-- the largest possible range of potential realized profit variation should be continued as a negotiation objective.

A final comment concerning the use of non-profit goals may also provide benefits for both Government and industry. Extracontractual influences controlled by individuals (technical specialists) may adversely affect the operations of otherwise efficient make-or-buy policies and staffing plans. An in-house technical hierarchy can influence a contractor to aggrandize capabilities to "gold-plate" performance, or capabilities for future performance, at the expense of effectiveness on the instant contract. The costs for this are paid in the long run by both the Government and industry. Thus, some extracontractual influences may motivate direct inefficiencies. Since redundant incentives will perpetuate the inefficiencies, it seems extremely logical in these situations that performance effectiveness should be manipulated by the largest possible range of potential profit through cost incentives.

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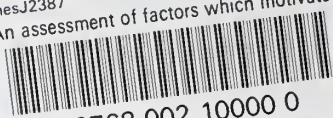
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